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High-order Hybridized Discontinuous Galerkin methods for Large-Eddy Simulation PABLO FERNANDEZ, NGOC-CUONG NGUYEN, JAIME PERAIRE, Massachusetts Inst of Tech-MIT — With the increase in computing power, Large-Eddy Simulation emerges as a promising technique to improve both knowledge of complex flow physics and reliability of flow predictions. Most LES works, however, are limited to simple geometries and low Reynolds numbers due to high computational cost. While most existing LES codes are based on 2nd-order finite volume schemes, the efficient and accurate prediction of complex turbulent flows may require a paradigm shift in computational approach. This drives a growing interest in the development of Discontinuous Galerkin (DG) methods for LES. DG methods allow for high-order, conservative implementations on complex geometries, and offer opportunities for improved sub-grid scale modeling. Also, high-order DG methods are better-suited to exploit modern HPC systems. In the spirit of making them more competitive, researchers have recently developed the hybridized DG methods that result in reduced computational cost and memory footprint. In this talk we present an overview of high-order hybridized DG methods for LES. Numerical accuracy, computational efficiency, and SGS modeling issues are discussed. Numerical results up to Re=460k show rapid grid convergence and excellent agreement with experimental data at moderate computational cost.

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